REMARKS

Claims 8, 9 and 30 – 37 were pending in the Application prior to the outstanding Office Action. Applicants have amended claims 8, 30 – 34 and 37 and have canceled claim 9.

I. RESPONSE TO CLAIM OBJECTIONS

In paragraph 1 of the Office Action, the Examiner objected to Claim 33 due to the use of the acronym LPTD. Applicants have amended Claim 33 to delete this acronym.

II. RESPONSE TO REJECTIONS UNDER 35 U.S.C. §103(a)

In paragraph 3 of the Office Action, the Examiner rejected Claims 7, 8 and 30 – 37 under 35 U.S.C. 103(a) over U.S. Patent 6,185,474 ("Nakamura") in view of U.S. Patent 6,256,330 ("Soraoka"). Applicants note that claim 7 has been canceled, and will therefore assume that the Examiner intended to list pending claims 8, 9 and 30 – 37 in this paragraph. Applicants respectfully traverse this rejection.

Nakamura discloses a network of exposure control units in a semiconductor fabrication facility. Each exposure control unit is able to receive data files over a network to facilitate maintenance and management of exposure work information. In the control architecture of Nakamura, host computer 30 communicates with semiconductor exposure units 10 for monitoring and control. Exposure control units 10 can receive work information data files from host computer 30, server 105 or from other exposure control units. The information received from sources other than the host computer 30 is limited to work information data files. See for example column 3, lines 26-41, and column 5, lines 28-52. These passages illustrate that an exposure unit can inquire "of other semiconductor exposure units and the host computer about the exposure work information." [col. 5, lines 45-47] Thus, the only information communicated between exposure control units is work information, i.e. "a data file such as a job file or a reticle file used for an exposure operation." [col. 1, lines 29-31].

In fact the main focus of Nakamura is to facilitate the availability of these data files. Nakamura does not disclose a distributed command and control architecture. In particular, the control architecture of Nakamura is a hierarchical control structure, where host computer 30 is responsible for management and control of exposure units 10. See for example column 6, lines 8-13, column 7, lines 9-20, and column 14, lines 20-30. These passages make it clear that the host computer is responsible for initiating exposure work, and the subsequent communication is limited to locating the appropriate data file necessary to perform the exposure work.

Thus, Nakamura does not disclose or suggest a control structure in which separate devices or "zones" are "independently controlled" by different threads or control programs running on the same or separate platforms in order to "cooperatively accomplish" a goal. In particular, the semiconductor exposure units 10 do not communicate among themselves to accomplish a goal, and host computer 30 does not employ multiple programs or threads, each of which is responsible for a different exposure unit and each of which communicate and cooperate among themselves.

The Examiner states in paragraph 3 that a semiconductor exposure unit (10) of Nakamura has an exposure work information program (13) and an equipment control program (12) which corresponds to the low level controller of the present invention. However, the low level controllers of the present invention are each controlled by a separate thread running on the same control logic computer. There is no disclosure or suggestion in Nakamura of multiple programs each controlling a separate mechanical device that communicate and cooperate to accomplish a common goal. The work information program (13) and the equipment control program (12) have different functions and do not need to cooperate. After a semiconductor exposure unit (10) has been instructed to carry out work by host computer 30, exposure work information program (13) locates and loads the work information data file, and subsequently equipment control program (12) performs the work. See for example column 6, lines 7-29. The control structure of Nakamura is strictly hierarchical, there is no cooperation between programs to accomplish a common goal.

The Examiner states in paragraph 5 that Nakamura discloses an embodiment in which exposure control units 10 communicate among themselves. However, as clarified above, this communication is limited to locating data files and does not involve a cooperative communication necessary to accomplish a common goal. Rather it is a inquiry regarding the location of a data file needed by a specific exposure control unit.

In contrast to Nakamura, the present invention involves multiple zones "independently controlled" by different threads that cooperatively accomplish "transferring a carrier" by communicating among themselves. In a preferred embodiment, these separate threads are residing on the same control logic computer and they each control and monitor different electromechanical devices. This is a different control architecture than that disclosed in

Nakamura and is not taught or suggested therein. It would not be obvious to one of ordinary skill to create a cooperative control architecture from Nakamura.

The cooperation of zone threads is an important aspect of the present invention. See for example page 27, lines 28-33, page 50, lines 17-29, page 51, lines 12-17, page 54, lines 18-24, page 55, lines 8-13, 29-33 and Figure 16. "The zone threads 512 perform the speed control methods cooperatively, using messages exchanged by zones threads 512 in the same neighborhood indicating the movement status of the material being moved." [page 54, lines 29-33]

In the preferred embodiment of the present invention, multiple zone threads run on a single control logic computer. Thus, each thread is responsible for controlling a different electromechanical device. Two neighboring zone threads cooperate to coordinate movement of material between them. Neither zone thread is in control of the other zone thread, the cooperatively accomplish a common goal. An advantage of the present invention is that the transport controller 104 does not have to be involved in lower level communication involving movement of material between zones, and within a control logic computer 106 there is no centralized control but a thread responsible for each zone.

Soraoka discloses a vacuum processing apparatus for use in a semiconductor fabrication facility. Soraoka does not disclose any details of a control architecture of the vacuum processing apparatus.

A. Independent Claim 8 is Patentable Over Nakamura In View of Soraoka

Independent Claim 8 recites, among other things, "a first track zone," "a second track zone," "a control logic computer" that includes "a computer mechanism" which comprises "a first control thread" and "a second control thread." Thus, the first control thread and second control thread are both included in the same control logic computer, each "configured to control and monitor operations" of a respective zone. In other words, these separate threads reside on the same control logic computer and independently control and monitor operations of different zones. Further, Claim 8 recites that "said first control thread communicates with said second control thread so that said first control thread and second control thread cooperatively accomplish transferring the carrier from the first track zone to the second track zone" Thus, the first and second control threads cooperate in the movement of the carrier.

Neither Nakamura nor Soraoka, separately or in combination, disclose a control logic computer including first and second control threads in which the first control thread monitors and controls a first track zone and the second control thread monitors and controls a second track zone, as recited in Claim 8. Further, neither Nakamura nor Soraoka, separately or in combination, disclose a first control thread communicating with a second control thread to cooperatively accomplish transferring a carrier, as recited in Claim 8. Therefore, Applicants respectfully assert that claim 8 is patentable over Nakamura in view of Soraoka.

B. Dependent Claim 9 and 30 – 37 are Patentable over Nakamura In View of Soraoka.

Dependent Claim 9 has been cancelled. Dependent Claims 30 – 37 depend directly or indirectly from independent Claim 8 and include all of its limitations. For at least the reasons stated above with respect to Claim 8, dependent Claims 30 – 37 are patentable over Nakamura in view of Soraoka.

III. RESPONSE TO REJECTIONS UNDER 35 U.S.C. §103(a)

In paragraph 4 of the Office Action, the Examiner rejected Claims 1 – 28 under 35 U.S.C. 103(a) over Nakamura in view of U.S. Patent 6,039,316 ("Jackson"). Applicants note that claims 1 – 7 and 10 – 29 have been cancelled and claims 30 – 37 are also pending, and will therefore assume that the Examiner intended to list pending claims 8 and 30 – 37 in this paragraph. Applicants respectfully traverse this rejection.

As explained in detail above, Nakamura discloses a hierarchical control architecture rather than a cooperative control architecture. Nakamura does not disclose or suggest any system in which transfer of a carrier between independently controlled track zones is achieved through cooperative communication between separate threads or programs.

Jackson describes a transport assembly in which arrays of microelectromechanical devices are utilized to transport objects. The devices are controlled by a hierarchy of computational elements. A global controller 230 contains these groups of computational elements. First level computation elements 604 communicate with second level computation elements 606, but not with other first level computational elements. Similarly, second level computation elements 606 communicate with first level computational elements 604 and with third level computational elements 610, but not with other second level computation elements.

Communication between computation elements at differing levels represents positional information and correctional commands. See for example column 7, lines 31-39.

In contrast to Jackson, the present invention discloses a cooperative control architecture in which separate threads are able to cooperatively accomplish the transfer of a carrier between track zones by communicating among themselves. In a preferred embodiment, these separate threads are residing on the same control logic computer and they each control and monitor different track zones. This is a different control architecture than that disclosed in Jackson and is not taught or suggested. It would not be obvious to one of ordinary skill to create a cooperative control architecture from Jackson.

C. Independent Claim 8 is Patentable Over Nakamura In View of Jackson

Independent Claim 8 recites, among other things, "a first track zone," "a second track zone," "a control logic computer" that includes "a computer mechanism" which comprises "a first control thread" and "a second control thread." Thus, the first control thread and second control thread are both included in the same control logic computer, each "configured to control and monitor operations" of a respective track zone. In other words, these separate threads reside on the same control logic computer and independently control and monitor operations of different track zones. Further, Claim 8 recites that "said first control thread communicates with said second control thread so that said first control thread and second control thread cooperatively accomplish transferring the carrier from the first track zone to the second track zone." Thus, the first and second control threads cooperate in the movement of the carrier.

Neither Nakamura nor Jackson, separately or in combination, disclose a control logic computer including first and second control threads in which the first control thread monitors and controls a first track zone and the second control thread monitors and controls a second track zone, as recited in Claim 8. Further, neither Nakamura nor Jackson, separately or in combination, disclose a first control thread communicating with a second control thread to cooperatively accomplish the transfer of a carrier, as recited in Claim 8. Therefore, Applicants respectfully assert that claim 8 is patentable over Nakamura in view of Jackson.

D. Dependent Claim 9 and 30 – 37 are Patentable over Nakamura In View of Jackson.

Dependent Claim 9 has been cancelled. Dependent Claims 30 – 37 depend directly or indirectly from independent Claim 8 and include all of its limitations. For at least the reasons stated above with respect to Claim 8, dependent Claims 30 – 37 are patentable over Nakamura in view of Jackson.

Additional Remarks

In light of the above, it is respectfully submitted that all of the claims now pending in the subject patent application are allowable, and a Notice of Allowance is requested.

A Petition for Extension of Time under 37 CFR 1.136 (a) has been enclosed with this Response. An appropriate fee under 37 CFR 1.17(a)(3) has also been enclosed with thie Response to include today, July 3, 2006.

The Commissioner is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 50-3548 for any matter in connection with this response, including any fee for extension of time, which may be required.

Respectfully submitted,

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